

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Implementation of Sections 716 and 717 of)	CG Docket No. 10-213
the Communications Act of 1934, as Enacted)	
by the Twenty-First Century Communications)	
and Video Accessibility Act of 2010)	

**CTIA PUBLIC NOTICE COMMENTS –
ACCESSIBILITY OF COMMUNICATIONS TECHNOLOGIES**

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CTIA¹ is pleased to submit these comments in response to the Public Notice issued by the Consumer and Governmental Affairs Bureau of the Federal Communications Commission (“Commission”) seeking information to inform the Commission’s preparation of its Biennial Report² required by the Twenty-First Century Communications and Video Accessibility Act of 2010 (“CVAA”).³

INTRODUCTION AND SUMMARY

The U.S. wireless landscape has improved dramatically for people with disabilities since the passage of the CVAA in 2010. Today, people with disabilities use and depend on wireless

¹ CTIA – The Wireless Association® (“CTIA”) (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life. The association’s members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry’s voluntary best practices, hosts educational events that promote the wireless industry and co-produces the industry’s leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

² *See Consumer and Governmental Affairs Bureau Seeks Comment on the Accessibility of Communications Technologies for the 2020 Biennial Report Required By the Twenty-First Century Communications and Video Accessibility Act*, Public Notice, CG Docket No. 10-213, DA 20-216 (rel. Mar. 2, 2020) (“Public Notice”).

³ Twenty-First Century Communications and Video Accessibility Act, Pub. L. No. 111-260 (2010) (codified in various section of 47 U.S.C.).

devices, applications (“apps”), and services for everyday communications and for nearly every aspect of their lives—from navigation, education, and employment, to information, transportation, entertainment, and more.

In the decade since the CVAA was enacted, wireless providers and equipment manufacturers have invested in accessibility to deliver countless innovations through mobile wireless services and devices that have transformed the wireless experience for millions of people with disabilities. Accessibility in 2020 can often be accomplished within the mobile device itself, through built-in features such as voice commands or high-definition audio and visual capabilities, compatibility with the Internet of Things (“IoT”) and assistive technologies through standardized interfaces, such as Bluetooth, or through millions of apps that enable people with disabilities to customize wireless services and devices to meet their unique needs.

For millions of Americans with disabilities, wireless has been a critical tool to break down barriers to independent living, employment opportunities, and civic engagement. U.S. consumers, including people with disabilities, use more wireless services to get more value than most people in the world. In addition, people with disabilities have a variety of resources—including resources offered by wireless providers, equipment manufacturers, and knowledgeable stakeholders—to make it easier than ever to find the devices, services, and apps that have the capabilities they need.

It is unmistakable that great progress has been made towards achieving the goal of the CVAA: to increase the access of people with disabilities to advanced voice, text, and video communications. Investment and innovation in accessibility has been spurred by Congress and the Commission setting flexible rules and expectations, rather than technology mandates. This approach has enabled each provider and manufacturer to craft unique devices and service plans

that respond to consumer demand and feedback from the accessibility community itself. As a result, people with a variety of abilities have benefitted from the exponential growth in accessible wireless devices and services since passage of the CVAA.

To be sure, the wireless industry will continue striving to achieve even greater access to advanced communications devices and services for all consumers in the years ahead. Wireless providers have institutionalized key procedures and policies so that accessibility considerations drive the product development process from the beginning, and are advanced alongside new products and services. Further, the imminent deployment of next-generation 5G networks will transform the manner in which people with disabilities communicate and interact through virtual reality, augmented reality, and many other cutting-edge innovations.

As the CVAA moves into its second decade, the Commission should ensure that the CVAA's foundational policies of reasonableness and flexibility continue to guide its decision-making. In so doing, the Commission can help ensure that wireless innovations of tomorrow, spurred by 5G, will continue to deliver on the promise of the CVAA so that people of all abilities can rely on advanced communications services and devices for every facet of their lives. The Commission should report to Congress that the flexible directives in the CVAA have helped make advanced communications services and products more inclusive and accessible to people with disabilities than ever before, and will continue to do so in the decades to come.

I. IN THE DECADE SINCE THE CVAA WAS ENACTED, MOBILE WIRELESS TECHNOLOGIES AND SERVICES HAVE DELIVERED COUNTLESS INNOVATIONS AND VALUE FOR PEOPLE WITH DISABILITIES.

Since 2010, wireless devices have transformed from being primarily a means of voice and text communication—with many networks still being enhanced to support broadband use—to being personal hand-held computers, used for voice, video, and data, and personalized from among millions of apps and features to meet each consumer's unique needs. Today, consumers,

including people with disabilities, use and depend on their wireless devices, apps, and services not just for essential communications, but to assist in their jobs, education, and healthcare, and to improve their everyday lives. The wireless industry has delivered on the promise of the CVAA and will continue to drive innovations and value for people with disabilities in the years to come.

A. The U.S. Wireless Industry’s Innovation and Investment Have Dramatically Enhanced the Networks, Devices, and Services Available for All Consumers.

Innovation and development in the mobile marketplace over the last decade have spurred dramatic growth in the amount and quality of options available to consumers today, improving the daily lives of people with disabilities in new ways each year. That innovation—fueled by advanced wireless networks and increased data capacity—has resulted in a proliferation of devices, apps, and service offerings that streamline and simplify all parts of daily life.

Innovative wireless products and services enable all Americans, including people with disabilities, to access undeniable benefits and conveniences with a simple glance or gentle touch.

1. 4G LTE Became a Platform for Accessibility.

When the CVAA was enacted, 4G LTE was just taking off—deployed by just two service providers and being launched in 38 metropolitan areas and more than 60 commercial airports.⁴

Today, nearly all U.S. consumers can access the benefits of 4G LTE,⁵ and more than 90 percent

⁴ See CNET, *MetroPCS launches first 4G LTE market and phone*, (Sept. 21, 2010, 8:09 AM) <https://www.cnet.com/news/metropcs-launches-first-4g-lte-market-and-phone/>; Press Release, Verizon, Verizon To Launch 4G LTE Wireless Network In Rochester Area By The End Of The Year (Oct. 6, 2010), <https://www.verizon.com/about/news/vzw/2010/10/pr2010-10-06y>; Press Release, Verizon Launches 4G LTE In Denver Metropolitan Area By The End Of The Year (Oct. 6, 2010), <https://www.verizon.com/about/news/vzw/2010/10/pr2010-10-06p>.

⁵ According to the Commission’s February 2020 report, 98.8 percent of the U.S. population lived in census blocks with LTE coverage by three or more providers at year-end 2018, and 99.9 percent of the population lived in areas covered by one or more LTE-based provider. See FCC, *Wireless Updates as of YE2018; Mobile Wireless Coverage*, <https://us-fcc.app.box.com/s/cvnu798tt2jv2zr8fhnzmydk4423hum2> (last visited Mar. 19, 2020).

of Americans use mobile devices with 4G LTE.⁶

4G connectivity was pivotal in launching a wave of incredible advancement in wireless technologies that benefits all individuals. Wireless providers were able to deliver services with faster speeds and more capacity to enable voice, text, and video communications—all revolutionary capabilities for accessibility. Indeed, the deployment of 4G LTE networks spurred the development of the app economy and other functionalities and services that have revolutionized various aspects of daily life, benefiting all consumers, including consumers with disabilities. For example, as part of these advanced network services, providers now offer HD voice and Voice-Over-LTE (“VoLTE”) on their networks and on numerous devices, enabling multi-way, high-definition conference calls and simultaneous data use, enhancing voice communications for people with hearing loss or speech impairment, and facilitating remote work and education for consumers with mobility impairments.⁷

While LTE was revolutionary in 2010, LTE is now the baseline service for most providers. And looking ahead, wireless providers today are working with manufacturers such as Samsung, Apple, LG, Motorola, Ericsson, Nokia, and Qualcomm to devote their resources to the rollout of the next generation of wireless—5G—which will enable higher transmission rates and lower latency and will be able to support even more data-intensive uses for Americans of varying

⁶ Omdia Knowledge Center, World Cellular Information Service (WCIS), Subscription Data, Market Share by Geography / Technology, Annual Total Selected Metrics for Jan 09 to Jan 20 (exported February 4, 2020).

⁷ See, e.g., Verizon, *All Basic-phones*, <https://www.verizonwireless.com/basic-phones/> (last visited Mar. 19, 2020); U.S. Cellular, *Enhanced Calling*, <https://www.uscellular.com/support/enhanced-calling/network-notice> (last visited Mar. 25, 2020); Mike Dano, *VoLTE Spreads to Sprint and Smaller Carriers Like Bluegrass, Southern Linc and Others*, FIERCEWIRELESS (Oct. 4, 2018, 12:35 PM), <https://www.fiercewireless.com/wireless/volte-spreads-to-smaller-carriers-like-sprint-bluegrass-southern-linc-and-others>.

abilities. Wireless providers including AT&T,⁸ Verizon,⁹ T-Mobile,¹⁰ and U.S. Cellular¹¹ have launched 5G on parts of their networks, which is already driving the development and growth of the 5G economy that will benefit consumers in myriad ways, including consumers with disabilities.

2. A Decade of Wireless Device Innovation Has Fueled Accessible Solutions.

Since the CVAA's passage, the number of devices in the market—and hence, the choices available to consumers with a variety of needs—have skyrocketed on virtually every metric. The number of smartphones available today has nearly doubled since 2010,¹² and smartphone ownership has grown from approximately 35 percent to 81 percent.¹³ As consumers increasingly embrace smartphones, they also rely on them as a more central part of daily life, thanks to

⁸ AT&T, *AT&T Begins Extending 5G Services Across the U.S.* (Nov. 22, 2019), https://about.att.com/story/2019/att_5g_leadership.html.

⁹ Verizon, *When Will Verizon Have 5G?* (Dec. 5, 2019), <https://www.verizon.com/about/our-company/5g/when-will-verizon-have-5g>.

¹⁰ T-Mobile, *T-Mobile 5G: It's On! America's First Nationwide 5G Network is Here* (Dec. 2, 2019), <https://www.tmobile.com/news/americas-first-nationwide-5g-network>.

¹¹ U.S. Cellular, *5G Technology*, <https://www.uscellular.com/plans/network-innovation/5g-technology> (last visited April 7, 2020).

¹² In 2010, more than 150 different smartphone models were being sold in the United States. Today consumers can choose from more than 300 unique smartphone models that are offered by U.S. wireless service providers—approximately *doubling* the number of smartphone models that were available ten years ago. This count was conducted by reviewing the websites of companies that filed HAC certification forms with the Commission, and does not include smartphone models offered by all extant MVNOs, which could include numerous additional unduplicated smartphones and feature phones.

¹³ In 2010, there were 78 million smartphones in the hands and back pockets of Americans, and by mid-2019, that number increased by more than 3.5 times to more than 284.7 million smartphones. See CTIA, *CTIA 2019 Annual Survey Highlights*, at 2 (2019), <https://api.ctia.org/wp-content/uploads/2019/06/2019-Annual-Survey-Highlights-FINAL.pdf>. See Mobile Factsheet, PEW RESEARCH CTR. (June 12, 2019) (“Pew Mobile Factsheet”), <https://www.pewresearch.org/internet/factsheet/mobile/>; Monica Anderson, *Mobile Technology and Home Broadband 2019*, PEW RESEARCH CTR. (June 13, 2019), <https://www.pewresearch.org/internet/2019/06/13/mobile-technology-andhome-broadband-2019/>; CTIA, *CTIA 2019 Annual Survey Highlights*, at 2 (2019), <https://api.ctia.org/wp-content/uploads/2019/06/2019-Annual-Survey-Highlights-FINAL.pdf>.

millions of apps, features, and audio, visual, mobility, and cognitive functionalities that benefit consumers with disabilities.

Indeed, every year the wireless industry makes innovative advances that consumers could have barely envisioned just a few years ago, but quickly become a central part of consumers' daily lives, like the ability to activate device commands using voice, use a built-in screen reader, or customize a device display to provide a more user-friendly cognitive experience. That wireless devices have become even more useful and important to people with disabilities is demonstrated by the Rehabilitation Engineering Research Center for Wireless Inclusive Technologies. The Wireless RERC found that 96.9 percent of people with disabilities who were surveyed reported owning or using a wireless device, such as a feature phone, smartphone, tablet, or wearable device, and that 87.7 percent of people with disabilities reported owning a smartphone.¹⁴ As a result, wireless devices and services are an increasingly central component of daily life for consumers with disabilities.

As the number of innovative devices continues to expand, so too does the availability of functionalities that benefit consumers with disabilities. In 2010, accessibility features in mobile devices included text-to-speech and screen readers, Hearing Aid Compatibility ("HAC"), support for Tele-Typewriters ("TTY") and Assistive Technology, predictive text, word completion, voice-activated features, and closed captioning.¹⁵ Today, wireless devices are used by consumers of all abilities to communicate and perform a variety of daily tasks. Most wireless devices today support many of the features that were available in 2010, in addition to a wide

¹⁴ *Survey of User Needs, SUNspot 1: Use of Mobile Phones by Individuals with Disabilities, 2017-2018, Volume 2019, Number 19-01*, WIRELESS INCLUSIVE RERC (Apr. 2019), http://www.wirelessrerc.gatech.edu/sites/default/files/publications/sunspot_2019-01_final_use_of_mobile_phones_by_individuals_with_disabilities_2017-2018.docx.

¹⁵ See Comments of CTIA, CG Docket No. 10-213, at 3 (filed Nov. 22, 2010).

variety of new accessible options and features, including real-time text (“RTT”), voice recognition, voice output, hands-free settings, and distractionless modes.¹⁶ And the percentage of HAC-compliant devices has also grown exponentially since the CVAA’s passage. Ten years ago, wireless handset manufacturers offered more than 630 unique devices, and many of those were already HAC-compliant, with 300 handsets receiving an M3 or M4 rating, and more than 230 handsets with a T3 or T4 rating.¹⁷ Today, more than 90 percent of wireless handsets on the market are HAC-compliant, and manufacturers offer 1,295 unique handsets, 1,194 handsets with an M3 or M4 rating, and 1,179 handsets with a T3 or T4 rating.¹⁸ This continued growth in the variety of devices available, and the portion of devices that are HAC-compliant, is only expected to continue, as accessibility is a priority for wireless manufacturers as they continue to deploy new devices.

3. App Development Since 2010 Has Helped Deliver Unique Accessible Solutions.

There has also been incredible growth in the number of apps since the CVAA’s enactment—a *nearly ten-fold* increase—including apps for consumers with disabilities.¹⁹ Since

¹⁶ See, e.g., John Markoff, *From Your Mouth to Your Screen, Transcribing Takes the Next Step*, N.Y. TIMES (Oct. 2, 2019), <https://www.nytimes.com/2019/10/02/technology/automatic-speech-transcription-ai.html>.

¹⁷ See Comments of CTIA, CG Docket No. 10-213 (filed Nov. 22, 2010).

¹⁸ FCC, *Hearing Aid Compatibility Reports: Device Manufacturers Summary*, <https://www.fcc.gov/wireless/systems-utilities/universal-licensing-system/hearing-aid-compatibility-status-reporting-1>, at *Manufacturers Handset Totals by Manufacturer, Reporting Period: Jul 01, 2018 - Jun 30, 2019*, at <https://www.fcc.gov/file/16529/download> (last visited April 14, 2020). Wireless service providers and their manufacturer partners look forward to working with the Commission to implement the latest technical standards into their HAC processes. See Comments of CTIA, WT Docket No. 20-3 (filed April 4, 2020).

¹⁹ Ten years ago, the app economy was in nascent stages, but there were already 439,837 apps available by April 2010. By March 2020, that number grew nearly tenfold to more than 4.2 million apps. Count of Active Applications in the App Store, POCKETGAMER.BIZ <https://www.pocketgamer.biz/metrics/app-store/app-count/> (last visited Mar. 19, 2020) (listing 4.2 million active apps available from the Apple App Store in the U.S.); Number of available applications in the Google Play Store from December 2009 to March 2020, STATISTA

2010, the app economy—powered by 4G—transformed nearly all sectors of consumers’ daily lives—from retail, work, education, transportation and healthcare to civic engagement, social networking, entertainment, and much more. Each consumer can leverage various apps to meet his or her unique everyday needs.

In the past decade, there has been corresponding growth in the number of innovative apps that allow consumers to tailor their wireless devices to meet all types of accessibility needs. For example, Apple’s App Store has an entire section devoted to “Apps for Accessibility,” which includes whole categories of apps for Voice Control, Vision, Hearing, Speech, Learning and Literacy, Physical and Motor, Accessible Home, Accessible Games, and even ASL Stickers. Likewise, Google’s Android offers an “Accessibility Suite” of apps that help consumers use their devices with eyes-free or with a switch device—an assistive technology useful for consumers with motor impairments— and offers features like the TalkBack screen reader, among many others.²⁰ The availability of these and many other accessible apps has dramatically changed the wireless ecosystem for all consumers by enabling device customization to help serve the needs of individual consumers.²¹

These accessible apps enhance device capabilities for consumers of all abilities, and in particular, accessible apps provide many benefits that promote the independence and engagement of, and opportunities for, consumers with disabilities. Google’s Envision app with TalkBack support, for example, describes the visual world with the help of Artificial Intelligence, and is

<https://www.statista.com/statistics/266210/number-of-available-applications-in-the-google-play-store/> (last visited Mar. 19, 2020) (approximately 2.9 million apps available from the Google Play Store at the end of 2019).

²⁰ See, e.g., AndroidAuthority, *10 Best Disabled Apps and Accessibility Apps for Android*, <https://www.androidauthority.com/best-disabled-apps-and-accessibility-apps-for-android-586626/> last visited Mar. 26, 2020).

²¹ See, *infra*, Section I.B.1.

designed to help the blind or low vision community with all aspects of daily life, from reading text or handwriting, describing scenes, scanning barcodes, to teaching the app to recognize friends and family.

Apps that use location-based services further enhance the social engagement, employment, and education opportunities for consumers, and especially people with disabilities. Microsoft's Soundscape application, for instance, uses 3D audio technology to create an interactive map for people who are blind or have low vision, helping them become better acclimated with and navigate their surroundings.²² Likewise, Google Maps improves the mobility of those who are blind or have low vision by providing detailed voice guidance when using its walk navigation feature.²³

Apps can also improve the ability of consumers with disabilities to live independent lives. Ride sharing apps like Uber, for example, offer on-demand wheelchair-accessible vehicles, which improve the mobility options of people who use wheelchairs by providing them with the freedom and convenience to choose their own means of travel.²⁴ Google maps similarly allows users to search for wheelchair accessible transit.²⁵ And the food delivery app Uber Eats uses Voice Over technology to enable users who are blind or low vision to safely order and have food

²² Microsoft, *Microsoft Soundscape*, <https://www.microsoft.com/en-us/research/product/soundscape/> (last visited Mar. 19, 2020).

²³ See Google Maps Help, *Accessibility in Google Maps*, <https://support.google.com/maps/answer/6396990?co=GENIE.Platform%3DiOS&hl=en&oco=1> (last visited Mar. 19, 2020).

²⁴ See Uber, *Accessibility at Uber*, <https://www.uber.com/us/en/about/accessibility/> (last visited Mar. 19, 2020); see also Lyft's *Commitment to Accessibility*, LYFT BLOG, <https://www.lyft.com/blog/posts/lyfts-commitment-to-accessibility> (July 9, 2019).

²⁵ See Google Maps Help, *Accessibility in Google Maps*, <https://support.google.com/maps/answer/6396990?co=GENIE.Platform%3DiOS&hl=en&oco=1> (last visited Mar. 19, 2020).

delivered from local restaurants.²⁶ These are just examples of the vast number of apps all dedicated to improving the lives of consumers with disabilities.

B. Wireless Industry Leadership Has Delivered on the Promise of the CVAA's Flexible Approach to Accessibility.

As the wireless industry has continued to significantly develop and expand over the last ten years, there has been a corresponding effort to ensure that consumers of all abilities can benefit from innovative wireless products and services. Leading up to the passage of the CVAA, and in the years immediately following its enactment, advocates for people with a variety of abilities urged the wireless industry to offer a wider array of accessible products and services.²⁷ Today's mobile wireless service and device offerings deliver on the promises of the CVAA to enhance the everyday lives of people with disabilities. CTIA's member companies in particular have taken significant strides in offering accessible products and service plans and conducting outreach initiatives in order to provide more accessible options for consumers with disabilities than ever before.

1. Myriad Accessible Devices and Functionalities Are Available Today to Help Meet Consumers' Varying Needs.

As noted above,²⁸ wireless devices today support a variety of apps, features, and functionalities to meet the needs of consumers with varying abilities, and innovations in video

²⁶ See Uber, *Accessibility: How to Use Voice Over*, <https://help.uber.com/ubereats/article/accessibility-how-to-use-voiceover?nodeId=ad2ea2bd-87b6-4bf2-a88f-5896e4213041> (last visited Mar. 19, 2020).

²⁷ See, e.g., Comments of the American Council of the Blind, CG Docket No. 10-213, at 1 (filed July 12, 2012) (explaining there was a paucity of mobile devices that meet their needs); Comments of Telecommunications for the Deaf and Hard of Hearing, Inc., *et al*, CG Docket No. 10-213, at 13 (filed July 25, 2012) (noting that available accessibility features at the time, such as receiving alerts through vibrations rather than flashing lights, were not routinely incorporated into most wireless devices and that accessible products and services were expensive and not offered at varying price points to accommodate people with limited means, and that there was limited information available to the community about what devices and service plans would work for their needs).

²⁸ See, *supra*, Section I.A.2.

calling and the use of standardized technologies have dramatically improved the user experience. The wireless industry continues to promote inclusive design and support a variety of devices, including feature phones, at varying price points to serve the needs of consumers.

Device Customization. Among other things, today’s wireless devices leverage rapid improvement in speech recognition technology, real-time audio descriptions, and enhanced video calling platforms.²⁹ Wireless devices also offer a host of settings consumers can enable to meet specific accessibility needs, such as enhancing contrast, allowing for button shapes,³⁰ inverting colors, setting automatic screen readers, and other options.³¹ For example, Apple’s recently launched iPhone 11 Pro and iPhone XS Max as well as its earlier models like the iPhone 7 and iPhone 8 all support RTT, voice control, hands-free settings, enhanced contrast and inverted color, and automatic screen reader settings.³² Samsung’s Galaxy latest models like the Galaxy Note10+ and the Galaxy S10+ as well as their earlier models like the Galaxy A20 and Galaxy A10e all support the same features.³³ And Google’s Pixel 4 and Pixel 3A likewise support RTT,

²⁹ See, e.g., Chris Velazco, *Apple’s Voice Control Is Important for Accessibility, and You*, ENGADGET (June 19, 2019), <https://www.engadget.com/2019/06/19/apple-voice-control-disability-accessibility/>; see also Apple, *Accessibility*, <https://www.apple.com/accessibility/> (last visited Mar. 27, 2020); Google, *Duo*, <https://duo.google.com/about/> (last visited Mar. 27, 2020).

³⁰ Button shapes is an accessibility feature on smartphones that re-creates the outlines found around tappable interface elements in previous versions of iOS, which can help increase accuracy particularly for consumers with mobility impairment or eye-hand coordination difficulty. See AbilityNet, *Button Shapes* (Feb. 2018), <https://mcmw.abilitynet.org.uk/button-shapes-iphone-ipad-ipod-touch>; iMore, *How to Enable Button Shapes for Visual Accessibility on iPhone and iPad* (Aug. 4, 2014), <https://www.imore.com/how-enable-button-shapes-visual-accessibility-iphone-and-ipad>.

³¹ See, e.g., American Foundation for the Blind, *Touchscreen Smartphone Accessibility for People with Visual Impairments and Blindness*, <https://www.afb.org/blindness-and-low-vision/using-technology/cell-phones-tablets-mobile/touchscreen-smartphone> (last visited Mar. 19, 2020).

³² See Apple, *iPhone*, <https://www.apple.com/accessibility/iphone/> (last visited Mar. 25, 2020).

³³ See, e.g., Samsung, *Galaxy Mobile Accessibility*, <https://www.samsung.com/us/accessibility/galaxy-mobile/> (last visited Mar. 27, 2020).

enhanced contrast, and inverted color settings among others.³⁴ Device manufacturers also allow consumers to customize their devices by enabling advanced features, such as VoiceOver, which permits consumers to use gestures to operate an iPhone, and Samsung’s Voice Assistant, which acts as a screen reader when enabled.³⁵

Further, today’s wireless devices routinely include a variety of capabilities that can be helpful to all users, including people with disabilities. For example, devices today offer the ability to set alert notifications using vibrations, activate and use the device using voice commands, and increase or decrease font size.³⁶ Higher resolution allows for videos to include readable closed captions. Virtual and augmented reality can help consumers learn skills, such as reading facial expressions and navigating crowded streets in a safe environment.³⁷

Video calling. The integration of front-facing cameras to enable video calling features in smartphones and other mobile devices has revolutionized communications for the accessibility community, and the deaf community in particular.³⁸ Video chat and conferencing that exists

³⁴ See, e.g., Pixel Phone Help, *Android Accessibility Overview*, <https://support.google.com/pixelphone/answer/6006564?hl=en> (last visited Mar. 27, 2020).

³⁵ See, e.g., Apple, *Turn On And Practice Voiceover on iPhone*, <https://Support.Apple.Com/Guide/Iphone/Turn-On-And-Practice-Voiceover-Iph3e2e415f/Ios> (last visited Mar. 25, 2020); Samsung, *How Do I Enable And Disable The Screen Reader On My Samsung Galaxy Smartphone?*, <https://www.samsung.com/uk/support/mobile-devices/how-do-i-enable-and-disable-voice-assistant-talkback-on-my-samsung-galaxy-smartphone/> (last visited Mar. 25, 2020).

³⁶ See, e.g., Samsung, *What Do the Accessibility Features Provide on My Samsung Phone?*, <https://www.samsung.com/au/support/mobile-devices/accessibility-features/> (last modified May 9, 2019).

³⁷ See Jackie Snow, *How People with Disabilities Are Using AI to Improve Their Lives*, NOVA (Jan. 30, 2019), <https://www.pbs.org/wgbh/nova/article/people-with-disabilities-use-ai-to-improve-their-lives/> (discussing how the Wheelie 7 uses machine learning to recognize a wheelchair user’s facial expressions, which are then used to command the user’s wheelchair).

³⁸ Indeed, recognizing the growing role of video calling technologies, the Commission launched the North American Number Council Interoperable Video Calling Working Group to explore how to facilitate the provision of these services. FCC, *FCC Announces Membership for NANC Interoperable Video Calling Working Group*, <https://www.fcc.gov/fcc-announces-membership-nanc-interoperable-video-calling-working-group> (last visited Mar. 27, 2020).

today, and will be further improved by high-speed, low-latency 5G connectivity, is delivering significant benefits to consumers who are deaf or hard of hearing and American Sign Language users, as well as consumers with mobility limitations and telecommuters.³⁹ Apple FaceTime calling and Google Duo are among the many platforms that have made connecting with friends, family, coworkers, and colleagues more seamless than ever before, with high-quality video and fast frame rates that make these services ideal for communicating with American Sign Language.⁴⁰ These and many other applications—Facebook Messenger, Imo, JusTalk, Skype, WhatsApp Messenger, and more—work on Android and iOS smartphones as well as tablets, computers, and Smart Displays, to enable consumers that are deaf or hard of hearing to communicate anytime, anywhere.⁴¹ And as all consumers increasingly embrace telework, platforms supporting video conferencing have evolved to deliver stronger connectivity and more accessibility features than before.⁴²

Interoperability. Devices today generally can connect to, and are compatible with, a wide range of other devices, since they commonly rely on standardized technologies, such as

³⁹ See discussion *infra* Section II.C.

⁴⁰ See, e.g., Apple, *Hearing Accessibility Features in iOS: FaceTime Video Calls*, <https://support.apple.com/en-us/HT210070> (last visited Mar. 27, 2020); Google, *Google Duo*, <https://duo.google.com/about/> (last visited Mar. 27, 2020).

⁴¹ See, e.g., Android Authority, *10 Best Video Chat Apps for Android!* (Sept. 21, 2019), <https://www.androidauthority.com/best-video-chat-apps-for-android-756190/>; Jignesh Padhiyar, *Best Video Chat Apps for iPad and iPhone in 2020: Do More than Video Calling!* (Mar. 26, 2020), <https://www.igeeksblog.com/best-video-chat-apps-for-ipad-iphone/>

⁴² For example, the ZOOM platform connects up to 100 participants via HD video and audio to deliver clear communications even over low-bandwidth connections, and offers closed captioning, automatic transcripts, keyboard accessibility, and screen reader support. See, e.g., ZOOM, <https://zoom.us/accessibility> (last visited Mar. 27, 2020). Likewise, online meeting platform BlueJeans' accessibility features enable consumers with disabilities such as visual and hearing loss to attend and participate in conference calls from any computer or mobile device, based on the Web Content Accessibility Guidelines 2.0 and the CVAA requirements. See BlueJeans, <https://www.bluejeans.com/accessible-online-video-conferencing-features> (last visited Mar. 27, 2020).

Bluetooth and Universal Serial Bus (“USB”). These and other standardized technologies allow a smartphone to become an all-in-one control center that can eliminate the need for multiple devices. This is especially beneficial for those users who prefer not to rely on adaptive devices that must be connected to wireless handsets. Because smartphones have become many consumers’ device of choice, innovative services that also improve accessibility are increasingly added onto smartphones, as discussed above.⁴³ To illustrate, several manufacturers and sound processors have introduced hearing devices that are specifically made to be compatible with the iPhone.⁴⁴ And smartphones can support the many innovative apps focused on the needs of the accessibility community, discussed further below.

Delivering Accessible Feature Phones. The wireless industry also continues to invest resources to keep closing gaps previously identified by the Commission in 2010 and in prior CVAA biennial reports to Congress. In the 2018 CVAA biennial report to Congress, the Commission highlighted a need for more basic feature phones (*i.e.*, non-smartphones) in the marketplace, particularly for the people who are blind or low vision and older adults.⁴⁵ Wireless providers have offered, and will continue to offer, a variety of basic feature phones for those customers who are looking for a lower cost product or a phone with more streamlined functionality, such as senior citizens or those with certain cognitive disabilities.⁴⁶

⁴³ See, e.g., Yenny Castro, *Smartphones and Accessibility*, MEDIUM (May 16, 2019), <https://medium.com/swlh/smartphones-and-accessibility-ccc1cd6ad4de>; Erin Magner, *Smartphones are Introducing Tech that Makes the World More Accessible for People with Disabilities*, WELLANDGOOD (Dec. 31, 2019), <https://www.wellandgood.com/good-advice/accessibility-settings/>.

⁴⁴ Apple, *Made for iPhone Compatible Hearing Devices*, <https://support.apple.com/en-us/HT210386> (last visited Mar. 19, 2020).

⁴⁵ *Biennial Report to Congress as Required by the Twenty-First Century Communications and Video Accessibility Act of 2010*, Report, 33 FCC Rcd 9828, 9834-35 ¶¶ 12-13 (2018).

⁴⁶ See Salimah LaForce, Dara Bright, and Andrew Garcia, *Mobile Phone Accessibility Review*, WIRELESS RERC, at 6 (Jan. 2019), http://www.wirelessrerc.gatech.edu/sites/default/files/publications/analysis_of_accessibility_features_on

Currently, wireless providers offer 62 models of basic feature phones. Verizon, for example, offers six basic feature phones models—the KAZUNA eTalk, Kyocera DuraXV LTE, Kyocera DuraXV LTE Non Camera, Alcatel GO FLIP V, Sonim XP5s, and Orbic Journey V—that offer features such as large, tactile, and easy-to-use keypads, high-contrast LCD displays, HAC and RTT support, and others that can be impactful for seniors and consumers with disabilities, and all of which use Verizon’s VoLTE technology to obtain high-definition voice for greater voice clarity. Verizon also allows customers to “bring their own device” if that option is more convenient for them.⁴⁷ U.S. Cellular, as another example, continues to offer moderately priced feature phones across several models, realizing that there is a continued market for these devices, and, similar to Verizon, U.S. Cellular allows customers to “bring their own device.”

Affordable Options. Accessible capabilities are automatically included in nearly every device, at nearly every price point, ensuring that people with disabilities have the ability to select from among the same product offerings as all other consumers, rather than from among a subset of devices that include the capabilities they need.⁴⁸ Indeed, leading device manufacturers include many accessible features in both their latest, and more basic, device models,⁴⁹ and

[mobile_phones_final_0.docx](#) (noting that both smartphones and basic feature phones “contain[] features that can be assistive to people who are blind, have low vision, cognitive disabilities and/or physical disabilities”).

⁴⁷ Verizon, *All Basic-phones*, <https://www.verizonwireless.com/basic-phones/> (last visited Mar. 19, 2020).

⁴⁸ There are more than 100 devices today that automatically include features such as HAC, TTY, and Bluetooth. *See, e.g.*, Phonescoop Phone Finder, <https://www.phonescoop.com/phones/finder.php> (last visited Mar. 27, 2020).

⁴⁹ Apple’s latest models like the iPhone 11 Pro and iPhone XS Max, as well as their more affordable models like the iPhone 7 and iPhone 8, all support RTT, TTY, voice control, hands-free settings, enhanced contrast, inverted colors, and automatic screen readers. *See* Apple, *iPhone Features*, <https://www.apple.com/accessibility/iphone/> (last visited Mar. 27, 2020). Likewise, Samsung’s latest models like the Galaxy Note10+ and the Galaxy S10+, as well as their more affordable models like the Galaxy A20 and Galaxy A10e, all support the same features and more. *See* Samsung, *Galaxy Mobile Accessibility*, <https://www.samsung.com/us/accessibility/galaxy-mobile/> (last visited Mar. 27, 2020).

accessible devices are offered through companies' programs for low-income consumers.⁵⁰ For example, SafeLink Wireless offers a range of devices with features including screen readers, virtual personal assistance and voice commands, closed captioning, and interfaces for consumers with cognitive and mobility disabilities.⁵¹ And T-Mobile has stringent requirements in place for its manufacturer partners to ensure the accessibility of all its handsets, whether feature phones or smartphones, regardless of price point.

2. Service Providers Offer Plans to Meet the Needs of Consumers with Disabilities.

Wireless service plans have evolved to offer a tremendous range of service options at a wide variety of price points to meet the needs of consumers with a wide range of abilities. These include plans tailored toward consumers that may have unique communication needs, such as service plans without voice communications for consumers who are deaf, hard of hearing, or speech impaired, disabled Veterans, and older adults. All of these offerings routinely allow for larger amounts of data use and greater flexibility at greater value than ever before. Indeed, America's wireless consumers get the most value for their money according to a new, comprehensive analysis of wireless plans offered in the 36 OECD countries.⁵² In particular,

⁵⁰ Other wireless providers offer smartphones and other devices through their Lifeline programs that these types of features. *See, e.g., Assurance Wireless, Maryland Lifeline Program*, <https://www.assurancewireless.com/lifeline-services/states/maryland-lifeline-free-government-phone-service> (offering qualifying low-income households a free android smartphone) (last visited Mar. 27, 2020).

⁵¹ *See, e.g., SafeLink Wireless, Accessibility*, <https://www.safelinkwireless.com/Enrollment/Safelink/en/Web/www/default/index.html#!/accessibilityPage> (last visited Mar. 19, 2020) (noting that SafeLink offers 235 devices including an array of HAC-certified devices and handsets that include RTT as a capability, and are compatible with TTY devices); *see also* SafeLink Wireless, *Browse Products*, <https://support.safelinkwireless.com/> (last visited Mar. 27, 2020).

⁵² Data from NERA Economic Consulting shows that—looking at a wide range of key factors, including minutes, amount of data included, SMS inclusion, number of lines, network coverage, download speeds, and price—U.S. consumers save up to nearly \$10 billion each year, stemming from the superior value that America's wireless providers offer. *See* Christian M. Dippon, PhD and Jason Claman, A

unlimited plans offer an excellent value for customers that wish to take advantage of frequent and highly intensive data uses, and accessibility-specific plans allow customers with various needs to tailor their plans to provide only—and more of—the specific services and functions they need.

Unlimited Plans. As both networks and devices have evolved, so too have providers' approaches to growing data consumption, with providers revising their offerings in response to changing consumer demands. In 2010, the major voice service providers were already offering unlimited voice, text, and data plans to give consumers the flexibility they needed. Today, unlimited data plans have become increasingly common throughout the OECD. A recent paper comparing mobile wireless value around the world reported that of the 1,554 plans analyzed, 168 (11 percent) offered unlimited data.⁵³ That proportion, however, is much larger in the United States, where 36 of 90 plans (40 percent) included unlimited data.⁵⁴ As a result, today's U.S. wireless providers continue to evolve their unlimited plans to meet consumers' needs. They offer options to use text, data, and hotspots at various affordable price points, and incorporate other beneficial service elements such as rollover, anytime, and mobile-to-mobile minutes. These unlimited data and messaging plans can benefit consumers who use messaging or data-intensive apps like video conferencing as a primary means of communication, including consumers who are deaf or hard of hearing or who have a speech disability. Individual and family unlimited plans are also significantly cheaper today as compared to a decade ago, and are

Comparison of the Mobile Wireless Value Proposition, NERA ECONOMIC CONSULTING, at 5, 17, 21-26 (Mar. 2, 2020), <https://www.nera.com/content/dam/nera/publications/2020/CTIA%20Final%20Study.pdf> (“NERA Paper”) (comparing data among 36 Organisation for Economic Cooperation and Development (“OECD”) countries).

⁵³ *Id.* at 16.

⁵⁴ *Id.* at 15-16.

offered by nearly all providers, including nationwide providers as well as regional and rural voice service providers.⁵⁵

Accessibility and Specialized Plans. Voice service providers also offer plans tailored toward consumers with unique communication needs, such as service plans without voice communications for the consumers who are speech impaired, deaf, hard of hearing, or disabled Veterans and older adults. Verizon's Nationwide Messaging Plans include plans at a range of price points with unlimited text, picture, and video messaging, and are designed for individuals who do not use voice minutes to communicate.⁵⁶ AT&T provides a special set of accessibility plans developed for customers who, because of a disability, are unable to effectively communicate over voice networks. These plans provide data-only network access and are offered at various service tiers and price points.⁵⁷ And T-Mobile offers an accessibility resource center that provides separate resources tailored to customers with different needs and

⁵⁵ See, e.g., AT&T, *Our Best Unlimited Plan. On America's Best Network*, <https://www.att.com/plans/unlimited-data-plans/> (last visited Mar. 19, 2020); Verizon, *More Unlimited Plans to Mix, Match and Save*, <https://www.verizonwireless.com/plans/> (last visited Mar. 19, 2020); T-Mobile, *There's a cell phone plan for everyone*, <https://www.t-mobile.com/cell-phone-plans> (last visited Mar. 19, 2020); Appalachian Wireless, *Unlimited Data*, https://www.appalachianwireless.com/?page=unlimited_data (last visited Mar. 19, 2020); Bluegrass Cellular, *Bluegrass Unlimited*, <https://bluegrasscellular.com/shop/plans/bluegrass-unlimited> (last visited Mar. 19, 2020); GCI, *Say Hello to Alaska's Best Unlimited Mobile Plans*, <https://www.gci.com/mobile/plans/unlimited> (last visited Mar. 19, 2020); Southern Linc, *Find the CriticalLinc Plan That Fits Your Needs*, <https://www.southernlinc.com/lte/plans.aspx> (last visited Mar. 19, 2020); TracFone, *Service Plans*, <https://www.tracfone.com/serviceplan/smartphone> (last visited Mar. 19, 2020); U.S. Cellular, *Unlimited*, https://www.uscellular.com/plangallery?flow=%20plan&catId=11512507_11512547 (last visited Mar. 19, 2020).

⁵⁶ Verizon, *Nationwide Messaging Plans*, <http://www.verizon.com/about/accessibility/nationwidemessaging-plans> (last visited Mar. 19, 2020).

⁵⁷ AT&T, *Basic and Feature Phone Accessibility Plans*, <https://www.att.com/shopcms/media/att/2016/shop/wireless/landing/disability-aging/pdf/PDF-Basic-andfeature-phone-accessibility-plans.pdf> (last visited Mar. 19, 2020); AT&T, *AT&T Accessibility Plan Certification*, <https://www.att.com/ecms/dam/att/consumer/help/pdf/TAP-disability-certification-form.pdf> (last visited Mar. 19, 2020).

challenges.⁵⁸

Several companies also provide plan offerings tailored to the mobile needs of seniors, such as T-Mobile's ONE Unlimited 55+,⁵⁹ AT&T's Senior Nation Plan,⁶⁰ and Consumer Cellular's low-cost options and AARP member discounts.⁶¹ These and other accessibility-specific plans are helping consumers with various needs to tailor their plans to provide the services and functions that meet their unique need.

Service providers are also committed to serving the needs of Veterans, who oftentimes also benefit from specialized offerings. T-Mobile's Magenta Military and Verizon's Military plans, for example, provide the benefits of an unlimited plan at a discounted price to service members, including disabled veterans and Gold Star family members.⁶²

3. Collaboration with the Accessibility Community and Enhanced Information Sharing Benefits Consumers.

Wireless providers and equipment manufacturers work hard to ensure their own device and service offerings meet the needs of all their customers. CTIA's member companies also understand that some of the most significant advances in accessibility and inclusive service can only be made when industry works together—and with the disability community—toward a common goal. Since 2010, wireless service providers and equipment manufacturers have

⁵⁸ T-Mobile, *T-Mobile Accessibility*, <https://www.t-mobile.com/customers/accessibility-policy> (last visited Mar. 19, 2020).

⁵⁹ T-Mobile, *ONE Unlimited 55+*, <https://www.t-mobile.com/offers/t-mobile-one-unlimited-55> (last visited Mar. 19, 2020).

⁶⁰ AT&T, *Change to AT&T Senior Nation Plan*, <https://www.att.com/esupport/article.html#!/wireless/KM1009134> (last visited Mar. 19, 2020).

⁶¹ Consumer Cellular, *Plans*, <https://www.consumercellular.com/Plans> (last visited Mar. 19, 2020).

⁶² T-Mobile, *Magenta® Military Plans*, <https://www.t-mobile.com/cell-phone-plans/military-discount-plans> (last visited Mar. 19, 2020); Verizon, *Military*, <https://www.verizonwireless.com/military/> (last visited April 1, 2020).

worked closely with people with disabilities and their advocates to ensure that the needs of people with disabilities are heard, understood, and met throughout various stages of device production, testing, and deployment. The collaboration between the wireless industry and consumers has led to the additional training of industry personnel. And the wireless industry disseminates extensive information regarding the accessibility of wireless products and services to people with disabilities, now more than ever before.

Inclusive Design. Wireless providers and manufacturers today are ensuring that accessibility is a driving component of product design. Indeed, Samsung recently stated that when developing its One UI 2 smartphone, which includes audiovisual functions such as a light sensing feature and a live transcribe feature to improve the user experience of those with disabilities, it “considered accessibility to be the most important element in the development process.”⁶³ Apple’s Human Interface Guidelines include three best practices for inclusive design: design with accessibility in mind, support personalization, and audit and testing for accessibility. Each principle guides Apple to prioritize simplicity and perceivability in all aspects of design, making complex tasks simple and straightforward to perform, and making sure all content can be perceived by individuals with a range of abilities.⁶⁴ In line with these principles, Apple builds accessible features into every operating system and every device to help people who are deaf or hard of hearing, and give people with physical limitations greater control over their lives.⁶⁵

⁶³ Samsung, *Accessibility for All: One UI 2 Brings Enhanced Accessibility Features to the Galaxy Range* (Oct. 30, 2019), <https://news.samsung.com/global/accessibility-for-all-one-ui-2-brings-enhanced-accessibility-features-to-the-galaxy-range>.

⁶⁴ Apple Developer, *Human Interface Guidelines*, <https://developer.apple.com/design/human-interface-guidelines/accessibility/overview/best-practices/> (last visited Apr. 14, 2020).

⁶⁵ See Apple, *Accessibility*, <https://www.apple.com/accessibility/> (last visited Mar. 27, 2020).

Like device manufacturers, voice service providers are also dedicated to ensuring that their devices are designed inclusively. For example, TracFone has established consultative relationships with disability organizations to obtain ongoing feedback regarding the user experience for people with disabilities to ensure that all its transaction channels are accessible and its phones support assistive technologies. Similarly, AT&T's accessibility best practices are included in the company's digital style guides, design systems, and development processes. Verizon's Universal Design Principles guide that Verizon's products and services be accessible to the broadest range of customers, including individuals with disabilities and seniors.⁶⁶ And T-Mobile's Accessibility Resource Center supports T-Mobile's commitment to ensuring that accessibility is a consideration throughout various aspects of the product planning processes, including initial design.

AccessWireless.org. The wireless industry is focused on sharing information about accessible products and services, and CTIA developed the industry-leading resource for accessibility—AccessWireless.org—nearly a decade ago. AccessWireless.org is a one-stop-shop for people with disabilities, seniors, veterans, and their families and caregivers to find information about accessible mobile products and services. The website is organized by category, providing a clear, intuitive resource for people with hearing, vision, mobility and manipulation, speech, and cognitive disabilities, as well as for seniors and veterans.⁶⁷ CTIA has continuously improved and expanded the site over the years, and relaunched AccessWireless.org in 2019 to provide even more information about wireless resources and tools available for people

⁶⁶ See Verizon, *Universal Design Principles*, <https://www.verizon.com/about/our-company/company-policies/universal-design-principles> (last visited April 14, 2020).

⁶⁷ AccessWireless Home, <http://accesswireless.org/Home.aspx> (last visited Mar. 19, 2020).

with disabilities, seniors, veterans, and their families and caregivers.⁶⁸ The newly designed webpage includes a tool to search the GARI database without leaving the webpage to help facilitate consumers' search for the right device, as well as an "A-Z" database of industry resources.⁶⁹ In addition, both CTIA and its members are regular speakers at, and sponsors of, accessibility events where industry reaches out directly to consumers regarding the accessibility of wireless products and services.⁷⁰

Accessibility Resources. Members also have dedicated portions of their websites explaining the accessibility features of their products and services.⁷¹ Indeed, major wireless providers offer accessibility resource centers that help guide consumers to the products and services that meet their needs, and also describe other accessibility outreach and initiatives. For example:

- U.S. Cellular has a webpage on Accessibility and Hearing Aid Compatibility, which provides educational material for consumers on the HAC rating system, the accessible phones available through U.S. Cellular, and how to enable accessible features on those devices.⁷²

⁶⁸ See Bryanna Evans, *Celebrating the ADA—and Looking Forward to What's Next*, CTIA Blog (July 26, 2019), <https://www.ctia.org/news/celebrating-the-ada-and-looking-forward-to-whats-next>.

⁶⁹ Press Release, Wireless Industry Highlights 'Wireless for All' at AccessWireless.org, <https://api.accesswireless.org/wp-content/uploads/2019/07/Access-Wireless-FINv2.pdf>.

⁷⁰ See, e.g., Access Wireless Blog, *Wireless Accessibility Helps Break Down Communications Barriers for the Deaf Community* (Sept. 23, 2019), <https://www.accesswireless.org/blogs-media/wireless-accessibility-helps-break-down-communications-barriers-for-the-deaf-community> (quoting TDI's Claude Stout explaining that "CTIA has continued its many, many years of substantial contributions toward fulfilling the promise and potential of our special niche community's participation in the wireless communication/information services market. TDI commends CTIA for joining us in the deaf and hard of hearing community in celebration of September 2019 as the Deaf Awareness Month."). CTIA also has sponsored a panel at HLAA's annual conference for many years to educate HLAA's members about wireless accessibility, including HAC.

⁷¹ See, e.g., TruConnect Wireless, *Using Your Phone With a Hearing Aid Device*, <https://www.truconnect.com/legal-accessibility> (last visited Mar. 19, 2020); Carolina West Wireless, *HAC Information*, <https://www.carolinawest.com/hac-information> (last visited Mar. 19, 2020).

⁷² U.S. Cellular, *Accessibility and Hearing Aid Compatibility*, <https://www.uscellular.com/support/accessibility-hearing-aid> (last visited Mar. 27, 2020).

- T-Mobile’s Accessibility resource center highlights its 100 percent score on the Disability Equality Index, indicating T-Mobile’s accomplishments in workplace inclusion, and provides resources to guide consumers to the products and services that meet a variety of communication needs, including accessibility support services, auditory and speech features, offers for seniors, virtual personal assistants, and more.⁷³
- AT&T’s Accessibility webpage describes AT&T’s commitment to empower anyone with disabilities and challenges with access to AT&T’s resources, products, and services, including portals dedicated to tools for vision, hearing and speech, cognitive needs, mobility, and aging support.⁷⁴
- Verizon has an Accessibility Resource Center, which includes information on services and features for auditory support, visual assistance, mobility tools, accessible content, and more.⁷⁵

Educational and Outreach Initiatives. CTIA also organizes and participates in a number of education and outreach efforts every year. These efforts help ensure that CTIA is involved with and supportive of the various initiatives of the accessibility community. In 2020 alone, these efforts have included participating in the CSUN Assistive Technology Conference,⁷⁶ organizing a Disability Policy Seminar,⁷⁷ planning events for Global Accessibility Awareness Day,⁷⁸ and sponsoring events held by the National Federation of the Blind and the American

⁷³ T-Mobile, *Accessibility*, <https://www.t-mobile.com/responsibility/consumer-info/accessibility-policy> (last visited Mar. 27, 2020).

⁷⁴ AT&T, *Accessibility: Mission*, <https://about.att.com/sites/accessibility/mission> (last visited Mar. 27, 2020); AT&T, *Accessibility: Products & Innovation*, <https://about.att.com/sites/accessibility> (last visited Mar. 27, 2020).

⁷⁵ Verizon, *Accessibility*, <https://www.verizon.com/about/accessibility/overview> (last visited Mar. 27, 2020).

⁷⁶ CSUN Center for Disabilities, *35th CSUN Assistive Technology Conference*, <https://www.csun.edu/cod/conference> (last visited Mar. 19, 2020).

⁷⁷ 2020 Disability Policy Seminar, https://disabilitypolicyseminar.org/?_ga=2.48952742.1635301677.1584646478-158597897.1584646478 (last visited Mar. 19, 2020) (This event was scheduled to take place Mar. 23-25, 2020, but was canceled due to COVID-19).

⁷⁸ Global Accessibility Awareness Day, <https://globalaccessibilityawarenessday.org/> (last visited Mar. 19, 2020) (being held virtually on May 21, 2020).

Association of People with Disabilities.

In addition, individual CTIA member companies have undertaken many initiatives of their own. For example:

- TracFone hosted its December 2019 Inaugural Accessibility Summit for leaders representing a wide array of disability organizations to get a better understanding of how it can better meet their communities' needs.
- AT&T collaborated with the Chicago and New York City Mayors' Offices for People with Disabilities and G3ict to produce an Inclusive Innovation Playbook called Smart Cities for All, the objective of which was to help cities, their partners, and stakeholders define inclusion as part of the technology innovation process and integrate it into urban innovation ecosystems.⁷⁹
- Verizon, in partnership with Cornell Tech, hosted the first summit on virtual, augmented, and mixed reality technologies for people with disabilities, XR Access.⁸⁰ XR Access also conducts research on the latest approaches and techniques to designing XR to benefit people with disabilities and convenes six working groups to help raise awareness of the importance of XR accessibility, collaborate with like-minded innovators and advocates, and create shared resources to communicate the importance of accessibility.⁸¹
- Intel's Director of IT and Operations spoke at the Consumer Electronics Show on the topic of digitally accessible workplaces.⁸²
- U.S. Cellular supplemented its internal resources for employees with the new Capable Associate Network ("CAN"), focusing on providing educational and developmental resources and increasing the awareness of matters that affect people with disabilities.⁸³

⁷⁹ Chris Penrose, *et al.*, *Smart Cities for All; Inclusive Innovation Playbook*, <https://smartcities4all.org/wp-content/uploads/2019/05/12-Playbook-XT.pdf> (last visited Mar. 19, 2020).

⁸⁰ Mike Shebanek and Larry Goldberg, *Verizon Media Accessibility Team And Cornell Tech Host First Summit On XR Accessibility*, VERIZON (Aug. 6, 2019), <https://www.verizon.com/about/news/verizon-media-accessibility-team-and-cornell-tech-host-first-summit-xr-accessibility>; XR Access, <https://xraccess.org/> (last visited Mar. 19, 2020).

⁸¹ XR Access, *Research*, <https://xraccess.org/research/> (last visited Mar. 19, 2020); XR Access, *Working Groups*, <https://xraccess.org/working-groups/> (last visited Mar. 19, 2020).

⁸² *How Equal Technology Creates Equal Access to Opportunity for All*, CES, <https://www.ces.tech/conference/32432/636654.aspx> (last visited Mar. 19, 2020).

⁸³ U.S. Cellular, *Diversity and Inclusion*, <https://www.uscellular.jobs/diversity-and-inclusion> (last visited Mar. 19, 2020).

- T-Mobile’s Diversity and Inclusion Council’s Access for Disabilities Network supports employees while generally broadening understanding and awareness about the unique talents and abilities of people with disabilities.⁸⁴
- Verizon Media, Getty Images, and the National Disability Leadership Alliance have partnered to create the Disability Collection—a growing collection of stock images that break stereotypes and authentically portray people with disabilities in everyday life.⁸⁵

Collaboration on Inclusive Services. CTIA member companies also routinely engage with persons with disabilities in the early stages of their careers as they develop professionally and ensure employees are trained on new accessible wireless services. For example:

- AT&T maintains a dedicated team of accessibility experts to inspire innovative accessibility solutions and to train employees on how to achieve accessibility in AT&T’s digital footprint with design, architecture, and quality assurance.
- U.S. Cellular has partnered with Horizons for the Blind to translate written materials into Braille and to produce large print material for the low vision.
- T-Mobile interacts with customers with accessibility needs in many ways, including through its Accessibility Council, to proactively identify ways to improve its Accessibility Webpage.
- Verizon founded initiatives Teach Access and The Disability Collection to ensure the next generation of creators and technologists are designing accessible products and services and that people with disabilities are represented.⁸⁶

CTIA members believe these collaborative approaches benefit persons with disabilities because they enable thoughtful discussions about the new challenges that may arise as

⁸⁴ T-Mobile, *Diversity*, <https://www.t-mobile.com/careers/culture-and-benefits/diversity> (last visited Mar. 26, 2020). T-Mobile has also sponsored multiple webcasts made available to the company’s leadership and employees across the enterprise showcasing its accessibility program and broader efforts in the accessibility space.

⁸⁵ See Verizon Media, *The Disability Collection*, <https://www.verizonmedia.com/accessibility/disability-collection> (last visited Mar. 21, 2020).

⁸⁶ See Guru Gowrappan, *Accessibility is Integral to Our Customers and Our Business*, Verizon (May 2, 2019), <https://www.verizon.com/about/news/accessibility-integral-our-customers-and-our-business>.

technologies evolve, including, for instance, in the context of Artificial Intelligence.⁸⁷ The wireless industry will keep moving forward to ensure that each new challenge is addressed head-on in its holistic efforts to provide new technologies and services to the benefit of all consumers.

All of these efforts help demonstrate how CTIA and its member companies are dedicated to collaborating with the accessibility community to help share information in order to educate and benefit consumers.

II. THE CVAA AND THE COMMISSION’S FLEXIBLE APPROACH TO IMPLEMENTATION HAVE ENABLED WIRELESS INNOVATION TO BENEFIT PEOPLE WITH DISABILITIES.

A. The Goals of the CVAA Are Being Met Because Congress and the Commission Wisely Chose to Let Market Demand and Innovation Lead the Way.

The significant strides made by the wireless industry over the last decade in increasing access to mobile services and devices by people with disabilities are largely the result of the “light touch” policies and regulations that are the hallmark of today’s accessibility landscape. From the beginning, Congress appropriately determined that the CVAA should be nonprescriptive, establishing goals for what must be accessible instead of prescribing how to accomplish accessibility. The Commission’s implementing regulations similarly prudently left room for the industry to innovate. This flexibility to innovate has translated into numerous advancements and new offerings that use multiple and novel approaches to increasing accessibility for people with disabilities, as described above.

In implementing the CVAA, for example, the Commission originally considered whether there are some accessibility features that are “so important or easy to include” that they must be

⁸⁷ See, e.g., *FCC Forum on Artificial Intelligence and Machine Learning*, FCC (Nov. 30, 2018) <https://www.fcc.gov/news-events/events/2018/11/forum-artificial-intelligence-and-machine-learning>.

deployed on every product used for advanced communications services, unless it is not achievable to do so.⁸⁸ The Commission suggested, as an example, that including a “nib” on the “5” key could be required to help individuals who are low vision locate the keys on a standard number pad arrangement.⁸⁹ CTIA and others, however, explained that such an approach, while laudable in its goal, would lead to a slippery slope in which increasing numbers of features would be sought to be on the list of those required for every product or service, and numerous disputes would arise over which features or disabilities are more “important” than others.⁹⁰ In addition, CTIA noted that any such list of features would quickly become outdated as technology progressed and revolutionary solutions emerged.

Because the Commission wisely refrained from imposing such a requirement, the notion of a required “nib” on the “5” key has long since been overtaken by the development of touch screens for wireless devices, which offer many benefits. Today, consumers who are blind or low vision can locate number keys in many ways, such as on a touch screen or through Google’s Android Accessibility Suite (formerly Google TalkBack),⁹¹ or those consumers can avoid using number keys altogether by programming contacts or numbers into their devices and substituting

⁸⁸ See *Implementation of Sections 716 and 717 of the Communications Act of 1934, as Enacted by the Twenty-First Century Communications and Video Accessibility Act of 2010, et al.*, Notice of Proposed Rulemaking, 26 FCC Rcd 3133, 3161-62 ¶ 76 (2011).

⁸⁹ See *id.* at 3161 ¶ 76, n.222.

⁹⁰ See Comments of CTIA, CG Docket No. 10-213, *et. al.*, at 25-26 (filed Apr. 25, 2011); *see also*, e.g., Comments of the Consumer Electronics Association, CG Docket No. 10-213, *et. al.*, at 25 (filed Apr. 25, 2011); Reply Comments of T-Mobile USA, Inc., CG Docket No. 10-213, *et. al.*, at 10 (filed May 23, 2011).

⁹¹ See Jerry Hildenbrand, *What is Google TalkBack?*, ANDROID CENTRAL (Sept. 16, 2014), <https://www.androidcentral.com/what-google-talk-back>; Abner Li, *Google Renames TalkBack App to Android Accessibility Suite with Latest Update*, 9TO5GOOGLE (June 20, 2018), <https://9to5google.com/2018/06/20/google-talkback-android-accessibility-suite/>.

voice commands for touch, such as through Apple’s VoiceOver on iOS.⁹² Thus, rather than being stuck with using an outdated technology, all users have benefitted from the ability to move forward with new ideas.

Similarly, while there was concern in 2010 about device compatibility with external screen readers,⁹³ the Commission sensibly refrained from imposing any specific technical standard for achieving external screen reader compatibility. Manufacturers were instead able to achieve accessibility by moving to standardized connection interfaces, such as Bluetooth.⁹⁴ Now people with disabilities have greater choice, at varying price points, in the accessible mobile products and services market and are better able to customize their devices and services to suit their needs and interests. This increase in consumer choice, spurred by the flexibility to innovate, has led to even greater customer satisfaction.⁹⁵

In contrast, technology mandates and prescriptive rules often stifle innovation and quickly result in outdated technologies. For instance, the Commission’s rules requiring wireless

⁹² See Robin Christopherson, *VoiceOver on the iPhone Turns 10 – And Turns Blind Access Up to 11*, ABILITYNET (June 20, 2019), <https://abilitynet.org.uk/news-blogs/voiceover-iphone-turns-10-and-turns-blind-access-11>.

⁹³ See, e.g., Letter from John G. Paré Jr., Executive Director for Strategic Initiatives, National Federation of the Blind, to Ms. Marlene H. Dortch, Secretary, FCC, CG Docket No. 10-145, at 2 (filed Oct. 14, 2010); Comments of the Telecommunications Industry Association, CG Docket No. 10-145, at 10 (filed Sept. 13, 2010); see also Comments of The National Association of the Deaf, *et al.*, CG Docket No. 10-213, at 5 (filed Nov. 22, 2010).

⁹⁴ The Bureau of Internet Accessibility reported in 2017 that the BrailleBack feature allows people to connect a refreshable Braille display to an Android device via Bluetooth. See BOIA Blog, *What Are Android Accessibility Features?* (June 20, 2017), <https://www.boia.org/blog/what-are-android-accessibility-features>; see also Google, *Android Accessibility Help*, <https://support.google.com/accessibility/android/answer/6006564?hl=en> (last visited March 26, 2020). Apple’s “Made for iPhone” hearing aids are “based on a Bluetooth technology designed by Apple.” Apple, *Accessibility*, <https://www.apple.com/accessibility/iphone/> (last visited Mr. 27, 2020).

⁹⁵ Accessibility-related complaints or inquiries have gone down more than 50 percent since 2015. See FCC CGB – Consumer Complaints by Category, <https://opendata.fcc.gov/Consumer/CGB-Consumer-Complaints-by-Category-2019YTD/kvap-rzqf> (last visited March 26, 2020) (compare 858 complaints in 2015 to 438 complaints in 2019).

services and products to support TTY technology are now obsolete and unnecessary to meet the needs of today's consumers. As CTIA previously explained,⁹⁶ despite the significant investments made by the wireless industry to support TTY on wireless handsets and over wireless networks pursuant to the Commission's mandate, consumers who are deaf, hard of hearing, or have speech disabilities have effectively abandoned use of TTY with wireless services. Instead, they have adapted or have access to other services that better address the underlying purposes of the wireless TTY mandate for 9-1-1 and relay services, including RTT.⁹⁷ The lesson from these and similar examples is clear: the Commission should continue to approach accessibility goals with the same flexible regulatory approach that has allowed innovation and experimentation to flourish and resulted in better wireless offerings for all consumers, including for individuals with disabilities.

B. The Flexible Framework Continues to Encourage the Wireless Industry to Focus on Accessibility Priorities.

As the wireless industry continues to grow and innovate, so must its approach to accessibility issues. The wireless industry proactively addresses issues by collaborating with interested parties and by involving them in planning and discussions throughout the product and service development process. Thanks to this coordination, there has been no need for changes to the Commission's implementation of the CVAA. By working closely with interested stakeholders and focusing on achieving beneficial results for people with disabilities, the

⁹⁶ See, e.g., Comments of CTIA, CG Docket No. 16-145 and GN Docket No. 15-178, at 3-7 (filed July 11, 2016); Comments of CTIA, GN Docket No. 16-145 and GN Docket No. 15-178 (filed Feb. 22, 2017); Comments of CTIA, GN Docket No. 16-145 and GN Docket No. 15-178 (filed Mar. 31, 2017).

⁹⁷ See Comments of CTIA, WT Docket No. 18-203, at 10 (filed July 26, 2018) (discussing the wireless industry's leadership in the rapid deployment of RTT on IP-enabled networks to replace 20th century teletypewriters with the benefits and flexibility of 21st century communications capabilities for people who are deaf, hard of hearing, or speech impaired).

wireless industry is overcoming remaining challenges and is committed to continuing this progress.

Three recent examples demonstrate how the wireless industry's collaborative approach to overcoming barriers is helping to achieve positive results for persons with disabilities.

1. The HAC Task Force Is Fulfilling the Multi-Stakeholder Commitment to Develop a Consensus-Based Recommendation on HAC Compliance.

The wireless industry remains dedicated to ensuring that consumers have access to HAC-compliant wireless handsets. Keeping their 2016 commitment,⁹⁸ the wireless industry and accessibility community established the multi-stakeholder HAC Task Force to assess the viability of mandating a 100 percent HAC-compliance requirement for all wireless handsets, considering technical and market conditions.⁹⁹ In the last year, CTIA has been working with the Hearing Loss Association of America, the National Association of the Deaf, Telecommunications for the Deaf and Hard of Hearing, Inc. and the other Joint Consensus Proposal Signatories to move this process forward. The Task Force put out a public Request for Information seeking applicants for administration of the Task Force, reviewed responses, and selected the Alliance for Telecommunications Industry Solutions ("ATIS") to serve as the Administrator of the Task Force.¹⁰⁰ ATIS began recruitment efforts for Task Force participants in 2019, and secured commitments from wireless device manufacturers, wireless service providers, consumer advocates, hearing aid manufacturers, academia, and more to participate in

⁹⁸ See *Improvements to Benchmarks and Related Requirements Governing Hearing Aid-Compatible Mobile Handsets*, Report and Order, 31 FCC Rcd 9336 (2016) (adopting the Joint Consensus Proposal that established the HAC Task Force).

⁹⁹ See ATIS, *Hearing Aid Compatibility Task Force*, <https://hac.atis.org/> (last visited Mar. 19, 2020).

¹⁰⁰ See Letter from Thomas Goode, ATIS General Counsel, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 15-285, at 1 (filed Feb. 6, 2020).

the work of the Task Force. The Task Force recently held its first formal meeting where stakeholders discussed the HAC Task Force's structure, as well as the group's upcoming research projects and next steps.¹⁰¹ These participants have engaged in the HAC Task Force's meetings and working group discussions and will continue to work collaboratively to develop the consensus-based recommendation for the Commission, which will be submitted no later than December 2022, as directed by the Commission.¹⁰²

2. The Wireless Industry's Deployment of Real-Time Text Is Benefiting Consumers.

The wireless industry is leading the deployment of RTT, which has replaced TTY as an accessibility service that allows for rapid and more conversational communication. RTT provides greater communications accessibility for people who are deaf, hard of hearing, or have speech disabilities by enabling consumers to conversationally engage without the need for specialized equipment or external plug-in devices. Apple, Samsung, LG, and Google have developed several RTT-enabled devices and are collaborating with the nationwide wireless providers to deploy these devices on their networks,¹⁰³ and the wireless industry is working toward making RTT fully interoperable across all wireless networks.¹⁰⁴

¹⁰¹ See *id.* at 3.

¹⁰² See *id.* at 2-3.

¹⁰³ See, e.g., Verizon, *Real-Time Text*, <https://www.verizon.com/about/accessibility/real-time-text> (last visited Mar. 19, 2020) (listing the RTT-enabled devices that are available on Verizon's network). Regional wireless providers are also working toward providing RTT solutions. See, e.g., Southern Linc, *RTT FAQs*, <https://www.southernlinc.com/privacy/wireless-accessibility/rtt.aspx> (last visited Mar. 19, 2019) (explaining that Southern Linc will offer a RTT-enabled device or over-the-top application by June 30, 2020, as required by the FCC's implementation timeline). U.S. Cellular's RTT will be launched in 2020, with a progressive uptick in RTT-capable devices thereafter.

¹⁰⁴ See Matthew Gerst & Kara Graves, *Real-Time Text is Wireless Accessibility for the 21st Century*, CTIA BLOG (Feb. 12, 2018), <https://www.ctia.org/news/real-time-text-is-wireless-accessibility-for-the-21st-century> ("Providers are also hard at work to make RTT interoperable across wireless networks soon.").

A key part of the industry’s efforts to move RTT forward has been its collaboration with the disability community through the Commission’s Disability Advisory Committee (“DAC”). The DAC, whose membership includes CTIA, other industry stakeholders, and members of the accessibility community,¹⁰⁵ worked together to study accessibility issues related to RTT and come up with potential options for addressing them, and recently submitted its recommendations to the Commission on RTT call integration.¹⁰⁶ Through the DAC, the wireless industry and the disability community will continue to advise the Commission on RTT as the technology evolves.¹⁰⁷

3. The Wireless Industry Is Working Collaboratively to Evaluate Interoperable Video Conferencing Solutions.

The CVAA included interoperable video conferencing (“IVC”) as an advanced communications service that must be made accessible,¹⁰⁸ but the Commission never concluded its rulemaking on this requirement,¹⁰⁹ because IVC did not—and today, still does not—exist in the marketplace. CTIA and its members recognize that video conferencing apps are beneficial to

¹⁰⁵ See *Appointment of Membership of Third Term of the Disability Advisory Committee*, Public Notice, 34 FCC Rcd 258 (2019) (stating that Committee members include CTIA, Apple, AT&T, T-Mobile, and Verizon, along with representatives from the American Council for the Blind and the Hearing Loss Association of America, among others).

¹⁰⁶ See Recommendation of the FCC Disability Advisory Committee, RTT-VRS Working Group, RTT Integration with VRS, FCC (Sept. 24, 2019), <https://docs.fcc.gov/public/attachments/DOC-359919A1.pdf>; Draft Recommendation of the FCC Disability Advisory Committee RTT-VRS Working Group, RTT Integration with Point-to-Point Videophone Calls, FCC (Sept. 24, 2019), <https://docs.fcc.gov/public/attachments/DOC-359918A1.pdf>.

¹⁰⁷ The DAC has been studying these pending issues. At its September 2019 meeting, the DAC adopted a recommendation on RTT integration with point-to-point video calls and a recommendation on RTT integration with VRS. In 2018, the DAC also adopted a recommendation regarding RTT and refreshable Braille displays. And in 2017, it adopted a recommendation for adoption of RTT by public safety entities.

¹⁰⁸ 47 U.S.C. § 153(1).

¹⁰⁹ See *Advanced Communications Services to Those with Disabilities*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 14557, 14584-87 ¶¶ 301-05 (2011) (seeking comment on the meaning of “interoperable”).

members of the accessibility community, and thus have been participating in efforts to facilitate the provision of interoperable video conferencing services.

In particular, CTIA has played a key role in the Interoperable Video Calling Working Group, a group convened in 2018 by the Commission as part of the North American Numbering Council's ("NANC") efforts. A CTIA representative co-chaired the working group, which also included CTIA member companies, as well as representatives of various groups representing the interests of persons with disabilities.¹¹⁰ The Working Group is tasked with evaluating available video calling services and exploring how to develop and integrate video calling between ten-digit telephone numbers,¹¹¹ and so spent significant time throughout 2019 learning about and evaluating potential means of achieving interoperable video calling, eventually submitting a report to the Commission on the results of its findings.¹¹² Currently, the Working Group's efforts are focused specifically on evaluating the technical and operational feasibility of interoperating with Telecommunications Relay Services to ensure that persons with disabilities can connect to Public Safety Answering Point telecommunicators, among other issues, and will submit a report on its findings no later than June 28, 2020.¹¹³ CTIA and its member companies

¹¹⁰ See *FCC Announces Membership of the North American Numbering Council Interoperable Video Calling Working Group and the Nationwide Number Portability Working Group's Technical Subcommittee*, Public Notice, 33 FCC Rcd 8901 (2018).

¹¹¹ See FCC, *NANC Working Groups*, <https://www.fcc.gov/about-fcc/advisory-committees/north-american-numbering-council/general/nanc-working-groups> (last visited Mar. 19, 2020).

¹¹² See Report on Interoperable Video Calling, Final Report to the NANC, Interoperable Video Calling Working Group (Sept. 2019), <http://nanc-chair.org/docs/reports/190912NANCInteroperableVideoCallingWorkingGroupFinalReport.docx>.

¹¹³ Letter from Kris Anne Monteith, Chief, Wireline Competition Bureau, FCC, to Jennifer K. McKee, Vice President and Associate General Counsel, NCTA – The Internet & Television Association, Chairperson, North American Numbering Council (Dec. 16, 2019), <https://docs.fcc.gov/public/attachments/DOC-361476A1.pdf>.

are committed to collaborating with other Working Group members and key stakeholders to reach consensus on any recommendations identified during the Working Group's studies.

These three examples are just illustrations of the many ways that CTIA and its members work with the disability community every day to try to solve new issues as they arise and to ensure that their latest products and services meet the needs of persons with different abilities.¹¹⁴

C. The Flexible Framework Will Enable Next-Generation 5G Networks and Technologies to Continue Enhancing Communications Opportunities for, and the Daily Lives of, People with Disabilities.

Looking ahead, the wireless industry is focused on delivering the benefits of next-generation networks—5G—to consumers across the country. 5G networks offer high speeds and low latency, along with the ability to enable further advances in IoT, enabling wireless devices and service capabilities that were unimaginable when the CVAA was passed in 2010. Powered by 5G, the future of accessibility will be even more revolutionary. These next-generation networks will not only enhance and improve how individuals, including those with disabilities, communicate, but also revolutionize entire economic sectors including healthcare, transportation, entertainment, and educational services, all of which will help individuals with disabilities lead more independent lives.¹¹⁵

The move to 5G is well on its way. T-Mobile launched its nationwide 5G network in December 2019, and it now covers more than 200 million people and more than 5,000 cities and

¹¹⁴ See also, *supra*, Section I.B.3.

¹¹⁵ See, e.g., T-Mobile, *5G for Everyone: A Game-Changer for Americans With Disabilities* (May 30, 2019), <https://www.t-mobile.com/news/5g-benefits-for-people-with-disabilities>; Samsung, *How 5G Could Improve Mobility for Stroke and SCI Patients*, <https://www.samsung.com/global/business/networks/insights/blog/how-5g-could-improve-mobility-for-stroke-and-sci-patients/>.

towns across America.¹¹⁶ AT&T's 5G network now appears in about 100 markets, and it plans to offer nationwide 5G in the first half of 2020.¹¹⁷ Verizon's 5G network reaches parts of 34 cities, and the company plans to double the number of cities by the end of 2020.¹¹⁸ U.S. Cellular is scheduled to launch 5G service in parts of multiple cities and urban and rural communities in Iowa and Wisconsin in the first quarter of 2020 and will ultimately serve the entire nation.¹¹⁹ 5G has also been launched in many public venues such as college campuses, public libraries, community centers, and sports arenas.¹²⁰

Consumers with all types of abilities will be better connected and be able to become more independent as a result of 5G networks.¹²¹ For example, 5G networks will enable:

¹¹⁶ See T-Mobile, *T-Mobile Reports Record Financials and Strong Customer Growth in FY 2019, Beating Increased Guidance While Balancing Growth and Profitability* (Feb. 6, 2020), <https://www.t-mobile.com/news/t-mobile-q4-fy19-earnings>; T-Mobile, *T-Mobile 5G: It's On! America's First Nationwide 5G Network is Here* (Dec. 2, 2019), <https://www.tmobile.com/news/americas-first-nationwide-5g-network>.

¹¹⁷ See AT&T, *5G for You*, <https://about.att.com/pages/5G> (last visited Mar. 18, 2020); AT&T, *AT&T Begins Extending 5G Services Across the U.S.* (Nov. 22, 2019), https://about.att.com/story/2019/att_5g_leadership.html.

¹¹⁸ See Press Release, Verizon 5G Ultra Wideband service available in more cities, Verizon (Jan. 30, 2020), <https://www.verizon.com/about/news/verizon-5g-ultra-wideband-service-available-more-cities>; Aaron Pressman, *Verizon to Double the Number of Cities with its 5G Mobile Service this Year*, FORTUNE (Feb. 13, 2020), <https://fortune.com/2020/02/13/verizon-5g-mobile-network-double-number-of-cities/>.

¹¹⁹ See U.S. Cellular, *5G*, <https://www.uscellular.com/plans/network-innovation/5g-technology> (last visited Mar. 18, 2020).

¹²⁰ See, e.g., AT&T *Reinvents the Live Sports Experience*, AT&T (Sept. 5, 2019), https://about.att.com/story/2019/5g_at_att_stadium.html; Monica Allevan, *Verizon plays up 5G for Super Bowl*, FIERCEWIRELESS (Jan. 30, 2020 6:25 AM), <https://www.fiercewireless.com/wireless/verizon-plays-up-5g-for-super-bowl>; Larry Bernstein, *How 5G Will Advance Educational Technology on Campus*, EdTech (Jan. 16, 2020), <https://edtechmagazine.com/higher/article/2020/01/how-5g-will-advance-educational-technology-campus>.

¹²¹ See, e.g., T-Mobile, *5G for Everyone: A Game-Changer for Americans with Disabilities* (May 30, 2019), <https://www.t-mobile.com/news/5g-benefits-for-people-with-disabilities>.

- Smart public transit systems that allow “way finding” for consumers who are blind or low vision to audibly locate public transportation options through the use of smart sensors;¹²²
- Enhanced telehealth and remote medical services that connect health care professionals with their patients 24/7;¹²³ and
- Virtual and augmented reality programs, assistive job seeking technologies, and a “tactile Internet”¹²⁴ to support educational and skills training opportunities for both children and adults with cognitive and learning disabilities.

The steady deployment, increased capacity, and faster speeds of 5G networks are also enhancing IoT development. Today, 5G and IoT offerings are already changing lives and moving us toward a more connected future. There are already 1.3 IoT devices per consumer today.¹²⁵ Nationwide 5G will fully unlock the potential of IoT, pushing that number to grow to 3.4 devices per person by 2023.¹²⁶ 5G networks will keep enabling emerging IoT applications so that consumers can take advantage of connected cars, smartwatches, health monitors, remote utility monitoring, and more.¹²⁷ IoT devices will further automate and personalize many aspects of life and work, making everyday tasks simpler and more accessible for all.

¹²² See CTIA, *Smart Cities Playbook: Building Your Connected Community*, at 17 (Feb. 25, 2020), <https://www.ctia.org/news/ctia-smart-cities-playbook>.

¹²³ See CTIA Blog, *The Doctor Will See You Now: How 5G Will Transform Healthcare* (Aug. 6, 2019), <https://www.ctia.org/news/the-doctor-will-see-you-now-how-5g-will-transform-healthcare>.

¹²⁴ See Rajat Kumar Kochhar, *The 5G Tactile Internet is Here. What Next?*, ERICSSON BLOG (Apr. 24, 2019), <https://www.ericsson.com/en/blog/2019/4/5g-tactile-internet> (explaining that a tactile Internet will allow users to interact with a remote or virtual environment in real time and can be used to develop robotic exoskeletons for those with disabilities); Sacha Kavanagh, *What is the Tactile Internet*, 5GUK (Oct. 29, 2018), <https://5g.co.uk/guides/what-is-the-tactile-internet/>.

¹²⁵ CTIA, *CTIA 2019 Annual Survey Highlights*, at 4 (2019), <https://api.ctia.org/wp-content/uploads/2019/06/2019-Annual-Survey-Highlights-FINAL.pdf>.

¹²⁶ *Annual Internet Report Highlights Tool*, Cisco, www.cisco.com/c/en/us/solutions/executive-perspectives/annual-internet-report/air-highlights.html (last visited Mar. 31, 2020).

¹²⁷ See Comments of CTIA, GN Docket No. 19-285, at 14-16 (filed Nov. 22, 2019) (describing CTIA members’ IoT initiatives).

As we move into the next generation of wireless with an eye toward ensuring consumers of all abilities can realize these benefits, industry is committed to continue undertaking collaborative efforts to make certain that the latest advanced communications services and technologies are accessible. Many CTIA members are already taking the initiative to reach out and explore how 5G can help people with disabilities. For example, in 2019, AT&T hosted a 5G-themed “Hackathon” with a “Shape Up Your Accessibility Challenge” to demonstrate to designers, developers, and creators of mobile solutions how to make technology accessible to people with disabilities and drive accessibility innovation for 5G virtual and augmented reality systems.¹²⁸ Verizon has also hosted a policy discussion with leaders from industry, disability advocacy, and others to examine how technology-driven accessibility could increase dramatically with the deployment of 5G.¹²⁹ T-Mobile led a conversation with a variety of experts to explain and inform how a nationwide 5G network will empower persons with disabilities. And Samsung published a blog on how 5G could improve mobility for stroke patients.¹³⁰ The wireless industry intends to continue to actively engage with interested stakeholders to help achieve a positive result for all in a 5G-connected world.

¹²⁸ See AT&T, *Social Responsibility: Accessibility*, <https://about.att.com/csr/home/reporting/issue-brief/accessibility.html> (last visited Mar. 18, 2020) (describing the “Shape Up Your Accessibility” challenge under “Outreach and Education”).

^{129/} See Verizon, *Mobility/Accessibility Panel Shows How 5G Will Enable Greater Personal Autonomy* (Mar. 12, 2018), <https://www.verizon.com/about/news/mobilityaccessibility-panel-shows-how-5g-will-enable-greater-personal-autonomy>.

¹³⁰ See Samsung, *How 5G Could Improve Mobility for Stroke and SCI Patients*, <https://www.samsung.com/global/business/networks/insights/blog/how-5g-could-improve-mobility-for-stroke-and-sci-patients/>.

CONCLUSION

The U.S. mobile wireless marketplace provides unparalleled choice and value to all consumers, including people with disabilities. Rapid innovation, increased data capacity, and next-generation network deployment have delivered products and services that were unimaginable when the CVAA was passed a decade ago. Throughout these dramatic changes to the wireless landscape, CTIA member companies have worked closely with members of the accessibility community to ensure that accessibility remains a priority, and have incorporated accessibility by design into their offerings. The Commission should report to Congress that the flexible directives in the CVAA have helped make advanced communications services and products more inclusive and accessible to people with disabilities than ever before, and will continue to do so in the decades to come.

Respectfully submitted,

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